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THE JOINT CHIEFS OF STAFF
WASHINGTON 25, D.C.

JCSM-127-62

16 February 1962

MEMORANDUM FOR THE PRESIDENT

Subject: Joint Chiefs of Staff Views on Resumption of
Nuclear Testing (U)

1. The Joint Chiefs of Staff consider that there is an urgent military requirement for an accelerated program of nuclear tests in various environments, including the atmosphere. The security of the United States depends to a large extent upon our ability to assure superiority in nuclear weapons and our ability to employ them effectively. This requires that our weapons development programs be pursued aggressively without handicaps of self-imposed restrictions on the manner of testing new concepts.

2. The basic objective of the nuclear test program is to increase the military capability of US forces. In order to achieve this objective, full-scale nuclear testing in various environments is needed to permit:

- a. Further development of advanced nuclear weapons.
- b. Better understanding of the effects of nuclear weapons.
- c. Proof testing of complete nuclear weapon systems in operational environments.

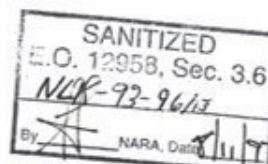
3. Although progress can be made in developing advanced nuclear weapons by underground tests supported by laboratory experimentation and theoretical analysis, only limited information can be obtained in the vital field of nuclear weapons effects. Then, too, there appears to be a finite yield limitation which cannot be exceeded in underground testing. Testing in the atmosphere offers the greatest opportunity for obtaining significant diagnostic and effects data for the devices and weapons fired. Additionally, complete weapons systems tests cannot be conducted in an underground environment.

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4. Our knowledge of certain weapon effects phenomena is extremely limited. The areas of principal uncertainty are the effects, particularly at high altitudes, which are pertinent to our missile defense, and to radio propagation and radar blackout; the effects in the oceans which are pertinent to fleet operations and antisubmarine warfare efforts; and the effects including both electromagnetic pulse and blast on hardened underground sites. The areas in which information is notably deficient include:

a. Effects of the high intensity electromagnetic pulse generated by a nuclear detonation. We know this phenomenon exists. In the conduct of previous nuclear test series, certain detrimental effects of the EM pulse were noted but often not explained. For example, instrumentation cables were fused or melted at considerable distances from the detonation. Spurious signals were acquired, often destroying records and sometimes even equipment. We now have insufficient data to determine specific effects against our command-control, communications, and weapons systems. However, the possibility that vital elements of our defensive and offensive weapon systems may be paralyzed or destroyed by an enemy attack is a matter for investigation at the highest priority. One test is now planned to investigate this phenomenon in the spring of 1962. If we discover that our cabling for our command and control systems is highly vulnerable to specific yields from particular heights of burst, then we may be able to proceed toward a solution. Resulting actions could include: redesign and shielding of all important land lines systems; redesign and hardening of the communications and control systems of our missile launch sites; and the introduction of new, less vulnerable communication and control systems. Until we have adequate data, it is difficult to fully evaluate the extent of the impact upon our own capability. It is imperative that we not underestimate the potential effect that this knowledge by the enemy could have on our deterrent posture. The control and weapon systems supporting our nuclear deterrent posture may have serious technical flaws.

b. The phenomenon of electromagnetic blackout. Again, we know that this phenomenon exists. Certain of our tests at high altitude indicate that radio communications and certain radar equipment may be seriously degraded and in some cases rendered

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PROPOSED ATMOSPHERIC TEST PROGRAM

This memorandum will review and bring up to date the major objectives, the program content, and the operational plans for the proposed atmospheric test program. A list and brief descriptions of the events now being planned are given in attachments. More detailed explanations of important departures from the original program are given in the body of this document.

General Objectives

The over-all objective of the program is to increase our understanding and improve our technology in the fields of weapons and weapon effects. During the three-year test moratorium the information gained from the 1958 HARDTACK series was exploited to the utmost both to design the most advanced weapons that could prudently be stockpiled without further testing, and to extend our understanding of the underlying principles by calculation and analysis. Further progress was difficult and slow. Inability to experimentally test extensions of existing principles and new ideas gravely hampered the weapons laboratories, reduced their momentum and, indeed, made it difficult to hold together the experienced teams of scientists and engineers.

Resumption of underground testing has, of course, permitted progress in important areas, and has had an invigorating effect on the laboratories. It is possible, though with difficulty in many cases, so to test all present single-stage devices,

..... With improved techniques it may be possible in the relatively near future to test two-stage devices of yields up to, say, 100 KT, and higher limits will probably ultimately be reached. However, experiments and tests at the larger yields must be conducted in or above the atmosphere; furthermore, certain weapons effects measurements can be conducted only in the atmospheric environment to which they pertain.

In the proposed atmospheric program stress has been placed on certain areas of special military interest, importantly those relating to delivery capabilities of our weapons in the face of enemy defenses and to our own defense against enemy weapons. Specific objectives include (1) increased knowledge of the effect of nuclear explosions on hardened missile bases, on missiles and their warheads and on radar and communications, all of importance to both offense and defense; (2) developments leading to decreased nuclear vulnerability of our own offensive warheads; (3) decreased weight-to-yield ratios of strategic missile warheads; decreased weight at given yields would permit greater diversity and pre-strike mobility of vehicles, and the incorporation of such penetration aids as clustered warheads or decoys and the hardening of individual missiles; conversely, higher yields would permit detonation at higher

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E.O. 12356, Sec. 3.4
NLK-93-94

by SKF NARA, Date 9/24/93

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APPENDIX "B"

Description of Events

Proposed Atmospheric Tests - By Functional Category

I. ADVANCED CONCEPTS

These tests should lead to major advances in nuclear weapon technology. The proposed experiments in the advanced concept area represent a balanced mixture of (1) the empirical approach with early availability of improved weapons in those weight classes known to be of interest, and (2) bolder experimental steps leading toward new devices of significantly higher levels of weapon effectiveness.

1. Balloon Test at Nevada Test Site (Added event)

This item has tentatively been placed on the list in order to provide an initial test above ground at the Nevada Test Site if so desired. Various low yield devices are being considered all of which could advantageously be tested above ground in order to achieve quicker and more accurate results than in underground tests. The final choice will depend upon scheduling considerations and on the results of certain underground tests.

2. (MESILLA, NAMBE, and OTOWI) (LASL), and

3. (CHETCO, YUKON, TANANA, and MUSKEGON) (LRL)

NOTE: The LASL and LRL are currently investigating the possibility of reducing the total of seven events by consolidation.

4. (YESO) (LASL)

This advanced design, has possible application to the Class D FUFO (full fuzing option) bomb and to warheads and missiles of this general weight class. This design is a major extension from previously tested areas in thermonuclear

systems and requires experimental verification.

5. (ROSEBUD) (LASL)

This is a physics investigation of the SKYBOLT and MINUTEMAN warhead which will also provide information on other devices using a similar basic pattern. Specifically, during the moratorium it has been essential to design conservatively and place strong, possibly unnecessary, restrictions on the

It is proposed to test a design in which the restrictions which have been included in the design of the device proposed for stockpile have been considerably relaxed. The results of this test will either indicate that present precautions are necessary or that greater liberties may safely be taken with consequent improvements in efficiencies and greater flexibility in future designs.

6. (SUNSET) (LASL) (Added event)

This is a physics investigation of an advanced version of the warhead which will also provide information on other devices using a similar basic design. This experiment will test a design (modified even further than the ROSEBUD event, above) that may lead to a marked increase in yield within the same general parameters which will allow adaption to the vehicle without major change to it. If markedly successful, this might replace (which is not yet in production), thus simplifying production problems since other versions will be produced in any case.

7. (SWANEE) (LRL) (Added event)

8. (BIGHORN) (LRL)

efficiency. Since this device represents a considerable extrapolation, provision has been made for a contingency device of more, conservative design, to be fired.....

9.(PETIT).....(LRL)

.....
.....
..... While several experiments are probably required to realize the final objective, it will not be possible to field more than one experiment in the initial atmospheric series.

10. 1-2000 Km (URRACA) (LASL) (Added event)

This third high altitude shot is proposed in addition to the two DOD high-altitude effects tests at 400 Km). The primary purpose of this added AEC experiment is to determine the feasibility of performing diagnostic measurements on nuclear tests conducted in space; the advantages of "space" testing include elimination of fallout, elimination of disruptive effects on communications, etc. This experimental shot is planned to be conducted at Johnston Island using the same type vehicle (THOR) planned for the two DOD shots. Data available from a "known" yield is necessary, hence the warhead whose yield will already be accurately measured in an earlier part of the test series will be used for this event. Diagnostic measurements will be made from solid fuel rockets launched to about 200 Km altitude from Kauai and 700 Km altitude from Pt. Arguello, as well as by land-based equipment.

II. DEVELOPMENT AND WEAPONS VERIFICATION

Testing, in this general category, is limited to designs that are such great extrapolations from tested configurations as to warrant testing both to provide normalization points for more advanced designs and to verify design of weapons designated for stockpile. Because of the large yields involved, it is not practical to test these items at full yield in an underground environment; to test underground at reduced yield is not practical since, in each case full yield determination is one of the primary objectives of the test. These tests are:

1.(QUESTA).....(LASL)

This is a 550-pound warhead
..... Since this warhead will be the backbone of a major system, an immediate confirmation test is important. There is no substitute warhead available at this level of performance in the time frame contemplated. In addition to its confirmation role, the test will provide a normalization point for more advanced designs.